REMARKS

Claims 22 and 23 are pending in the application. By this Amendment, claim 22 is proposed to be amended. Support for the claim amendment can be found throughout the specification and claims as originally filed. See, for example, page 11, lines 6-10, of the specification.

It is respectfully submitted that the proposed amendment will not require additional search and/or undue consideration and therefore should be entered at this time.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of the foregoing amendments and the following remarks.

Rejections under 35 U.S.C. § 103

(i) Claim 22 has been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent Publication No. 2002/0014647 ("Seidl") in view of U.S. Patent No. 7,112,539 ("Lee"). The rejection is respectfully traversed.

The Office has the initial burden of establishing a **factual basis** to support the legal conclusion of obviousness. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). For rejections under 35 U.S.C. § 103(a) based upon a combination of prior art elements, in KSR Int'l v. Teleflex Inc., 127 S.Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007), the Supreme Court stated that "a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some **articulated reasoning with some rational underpinning** to support the legal

conclusion of obviousness." In re Kahn, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir.) (emphasis added).

Amended independent claim 22 recites a capacitor of a semiconductor device, the capacitor comprising: a lower electrode; an AHO($(Al_xHf_{1-x})O_y$) film formed on the lower electrode; an upper electrode formed on the AHO film; and **a dielectric film having a dielectric constant that is higher than that of the AHO film between the upper electrode and the AHO layer**, wherein **the dielectric film is an HfO_2 layer, a ZrO_2 layer, or an STO layer**.

Seidl relates to a trench capacitor, for use in a semiconductor memory cell, with a trench which is formed in a semiconductor substrate; a first and second conducting capacitor plate, located in the trench; a dielectric layer, located between the first and second capacitor plates, as the capacitor dielectric; an isolation collar in the upper region of the trench; and a conducting filling material, filled into the trench, and to a corresponding method of production. (Page 1, paragraph [0001]). Seidl discloses a dielectric layer, such as Al-Hf-O, which is located between the first and second capacitor plates. (Page 3, paragraph [0050]).

Seidl does not disclose or suggest **a dielectric film having a dielectric constant that is higher than that of the AHO film between the upper electrode and the AHO layer**, as presently recited in amended independent claim 22.

The Examiner cites Lee to teach a high-k dielectric layer.

Lee relates to a multi-layer dielectric layer structure for a semiconductor device. (Abstract). Lee discloses a multi-layer dielectric layer structure comprising a silicate interface layer and a high-k dielectric layer overlying the silicate interface layer. (Col. 2, lines 51-55). Lee discloses that the high-k dielectric layer comprises one or more ordered pairs of first and second layers, wherein the first layer is formed

of HfO_2, Ta_2O_3, Y_2O_3 or ZrO_2 and the second layer is formed of Al_2O_3. (Col. 3, lines 1-4).

In contrast, independent claim 22 recites that the **dielectric film is an HfO_2 layer, a ZrO_2 layer, or an STO layer**. Independent claim 22 does not recite one or more ordered pairs of first and second high-k dielectric layers, as required by Lee.

Further, it should be noted that Lee discloses that when bulk HfO_2 or ZrO_2 are used for dielectrics, an uncontrolled natural silicate layer may be undesirably formed unable to control the composition of Si. (Col. 4, lines 33-39).

As such, Applicants respectfully submit that Lee appears to be teaching away from the presently recited **dielectric film** which **is an HfO_2 layer, a ZrO_2 layer, or an STO layer**. Applicants direct the Examiner's attention to M.P.E.P. § 2143.01, wherein it is provided that if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. (See, In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)).

Applicants respectfully submit that Seidl and Lee fail to disclose or suggest a **dielectric film** which **is an HfO_2 layer, a ZrO_2 layer, or an STO layer**. Furthermore, Applicants respectfully submit that Lee teaches away from a **dielectric film** which **is an HfO_2 layer, a ZrO_2 layer, or an STO layer**, as recited in independent claim 22.

Therefore, for at least the above-noted reasons, Applicants respectfully request that the obviousness rejection of claim 22 over Seidl in view of Lee be withdrawn.

(ii) Claim 23 has been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Seidl in view of Lee and U.S. Patent No. 6,486,080 ("Chooi").

Applicants respectfully disagree with the rejection for the following reasons.

Claim 23 depends from independent claim 22. Chooi is cited merely as disclosing the additional features recited in dependent claim 23. As such, Chooi fails to cure the many above-noted deficiencies with regard to Seidl and Lee. For at least the reasons provided hereinabove, Applicants respectfully submit that dependent claim 23 is also patentable over Seidl in view of Lee and Chooi for at least the same reasons.

It should further be noted that Lee discloses "it is preferable that the upper most layer 22 of the high-k dielectric layer 14 be formed of Al203" (See col. 6, lines 19-22).

The disclosed content in Lee indicates that a dielectric layer, such as an HfO_2 layer, a ZrO_2 layer or an STO layer is not used as the upper most dielectric layer contacting the upper electrode. However, in the present invention, a dielectric firm contacting the upper electrode is an HfO_2 layer, a ZrO_2 layer or an STO layer.

Accordingly, Applicants respectfully request that the obviousness rejection over Seidl in view of Lee and Chooi be withdrawn.

Conclusion

Applicants invite the Examiner to contact Applicants' representative at the telephone number listed below if any issues remain in this matter, or if a discussion regarding any portion of the application is desired by the Examiner.

In the event that this paper is not timely filed within the currently set shortened statutory period, Applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

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